INEL concludes TMI hydrogen burn study

by Terry Smith, EG&G Idaho

An INEL study on the hydrogen burn in the reactor building during the 1979 Three Mile Island accident is providing the nuclear community with a better understanding of hydrogen generation and burn phenomena during accidents of this nature.

Information from the study can also help researchers better understand the extent of core damage and the sequence of events during the accident. This understanding aids in planning for defueling of the core and provides an important benchmark for computer codes used to predict hydrogen generation and core damage during severe accidents.

The study confirms earlier assessments that the concentration of hydrogen gas was not sufficiently high for the gas to explode, that the hydrogen gas was well mixed with air in the reactor building, and that it burned over a period of about 15 seconds.

According to the study, gases in the building during the burn reached momentary temperatures of approximately 1300 degrees Fahrenheit, that prior to the burn, air in the building consisted of about eight percent hydrogen, and it burned down to about one percent residual hydrogen.

"The study confirms that pressures generated during the burn were well below the reactor building design pressure, and consequently the burn did not endanger TMI personnel or the public," says program manager Jim Jacoby, with the EG&G Idaho TMI Technical Support Branch.

The TMI Unit 2 Hydrogen Burn Investigation Program was conducted by the EG&G Idaho TMI Technical Integration Office. Assistance was provided by Rockwell Hanford Operations, Lawrence Livermore Laboratory and Sandia National Laboratories.

The investigation relied on examination of burn materials in the containment building, analysis of instrument data collected during the accident, gas composition data collected after the burn, engineering calculations, and data from hydrogen gas burn experiments conducted elsewhere.

Calculations show that during the accident about 450 kilograms of hydrogen were generated in the core. This information can be used to determine the amount of zirconium oxidized, which in turn can provide insight on the extent of core damage.

During the 1979 TMI accident, the accumulation of hydrogen in the reactor vessel and the reactor building was a major concern. Analysis of the accident has shown that the hydrogen was generated after the reactor lost coolant, overheated, and zirconium in the core reacted with steam, oxidized and liberated large quantities of the gas. Most of this hydrogen was released to the reactor building through the reactor coolant drain tank rupture disk, and it ignited about 10 hours after the accident sequence started. While the burn caused some damage to equipment and fixtures inside the reactor building, it did not affect the performance of safety systems.

Med techs stay sharp with latest techniques

by John Walsh, EG&G Idaho

They may work in vein, and needle you on occasion, but, the INEL's three medical technologists have your health at heart.

The medical technologists, or med techs, in the site Medical Division are Ronald Hult, Karen Barrett and David Scholes. April 8-14 was their week, National Laboratory Week, when the medical technology profession was recognized for its contributions and work in supporting physicians.

Each year in September, med techs from Idaho, Montana, Utah, Wyoming and Colorado gather in Jackson, Wyo. for a regional meeting. Scholes says state and regional meetings and national conferences are valuable "because they help us keep up with state-of-the-art techniques and ideas and help us continue our education."

Featured speaker for the Jackson conference last September was artificial heart surgeon Dr. William DeVries, University of Utah Medical Center, who led the team which implanted the artificial heart in Barney Clark. DeVries talked about the role medical technologists played in the case performing important laboratory tests in support of the medical team. On the agenda, too, were physicians who work in the astronaut program. Additionally, there were lectures and seminars on subjects such as hematology, microbiology, blood chemistry, blood banking and ways to alleviate stress.

Scholes notes that medical technology used to be a very generalized profession and not until 1960 in Idaho was there even a college degree offered in medical technology. Today, medical technologists are becoming more specialized because tests used in the profession are more specialized.

Tests performed by med techs, says Scholes, provide physicians with valuable information when they are making clinical diagnoses about a patient.

Medical technologists must be certified by a certifying agency. EG&G Idaho participates in a medical laboratory evaluation program with the American Society of Internal Medicine. Four times a year, the society sends an "unknown" test sample to labs in the program. The technologists must test the sample to identify its makeup and then send the findings to the Public Health Department for screening. Test results must meet department criteria. If test results fall outside acceptance limits of the department, necessary corrective measures are taken to ensure that quality control is maintained by the lab technologists.

In addition, the site technologists have their own quality assurance program to supplement the state regulatory program to ensure and maintain INEL lab proficiency.

A LITTLE MED-TECH humor never hurt anyone, concedes EG&G Idaho med tech Dave Scholes. However, the expertise medical technologists provide physicians is serious business...a business which calls for giving physicians accurate information. Scholes is pictured in front of a standard piece of laboratory equipment, the Coulter Model S, used in performing a number of tests on blood.

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